CAAM 564: NUMERICAL OPTIMIZATION

Instructor: Luis Nunes Vicente
Email: lnv@mat.uc.pt
Office: Duncan Hall 2007
Website: `http://www.mat.uc.pt/~lnv`

Class Time: MWF 9:00-9:50 am
Classroom: Duncan Hall 1075
Office Hours: MW 10:45-11:45 am
or by appointment

1 Course Description

The course deals with the mathematical and numerical solution of continuous constrained optimization problems. We will start by basic notions of convexity and existence of solution of optimization problems. A review of the theory of constrained optimization (optimality conditions and duality) is given next. The focus will then turn into linear programming and the simplex method. Then, after a quick review on quadratic programming, we will cover numerical schemes for constrained nonlinear optimization problems (nonlinear programming) : SQP, penalty, augmented Lagrangian, and interior-point methods. The last topic will be interior-point methods for linear programming.

2 Prerequisites

Basic understanding of linear algebra, vector calculus, and numerical analysis.

3 Required Texts and Materials

A pdf document containing all slides presented in class will be made available, and no other material is required.

The course is partially based on the books: J. Nocedal and S. J. Wright, *Numerical Optimization*, second edition, Springer, Berlim, 2006 and I. Griva, S. G. Nash, and A. Sofer, *Linear and Nonlinear Optimization*, second edition, SIAM, Philadelphia, 2009.

4 Assignments, Exams, and Grades

There will be four unpledged homework assignments (counting 10% each) and one pledged assignment (counting 30%). The remaining 30% are for participation in class.

Some homework questions involve Matlab computer projects. Students may discuss the projects among them but each student is responsible for writing her/his own codes. Source code must be turned in.

The pledged assignment is open book but only the course material (slides, class notes, and homework assignments) can be consulted.

5 Other Issues

The course complies to all Rice University policies concerning Absences, Honor Code, Disability Support, and Syllabus Change.